

12. (Amended) A substrate for an adhesive tape, which comprises an olefin polymer and a flame retardant, but substantially no halogen atom, wherein the olefin polymer comprises the following Component A and Component B:

Component A: a thermoplastic resin having a carbonyl oxygen atom in the molecular skeleton;

Component B: a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps;

wherein the Component B has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, a dynamic storage modulus (E') at 80°C of not less than 40 MPa and less than 180 MPa, and a dynamic storage modulus (E') at 120°C of not less than 12 MPa and less than 70 MPa.

REMARKS

The Present Invention

The present invention relates to adhesive tape and a substrate therefor.

The Pending Claims

Claims 1, 2, 6-12, and 15-20 are currently pending. Reconsideration of the pending claims is respectfully requested.

Amendments to the Claims

The claims have been amended so as to more particularly point out and distinctly claim the invention. In particular, the elements of claims 3, 4, and 5 have been incorporated into claim 1. Accordingly, claims 3, 4, and 5 have been canceled. In addition, the features of claims 3, 13, and 14 have been added to claim 12, and, therefore, claims 13 and 14 also have been canceled accordingly. No new matter has been added by way of these amendments. The precise amendments to the claims, as well as the text of the pending claims as amended, are set forth on separate attachments hereto.

Summary of the Office Action

Claims 1, 2, and 8-11 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly not being enabled. The Office Action rejects claims 1, 2, and 8-11 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Richardson et al. (WO 97/05206), Kawabata et al. (JP 05047249), or Tucker et al. (U.S. Patent

5,498,476). In addition, claims 1-20 are rejected under 35 U.S.C. § 103(a) as obvious in view of Tucker et al. (U.S. Patent 5,498,476), either individually or in combination with Richardson et al. (WO 97/05206).

Discussion of the Section 112, First Paragraph, Rejection

Claims 1, 2, and 8-11 are rejected under section 112, first paragraph, because the Examiner alleges that the olefin polymer as set forth in claim 3 is essential to the invention. Claim 1 has been amended to recite the features of claim 3. The rejection should be withdrawn in view of the amended claims.

Discussion of the Anticipation/Obviousness Rejection

Claims 1, 2, and 8-11 are rejected under sections 102 and 103, because the Examiner alleges that the claimed subject matter is anticipated by or obvious over the cited references. Claim 3 was not so rejected, and as discussed above, claim 1 has been amended to recite the features of claim 3. Accordingly, the rejection has been rendered moot in view of amended claims and should be withdrawn.

Discussion of the Obviousness Rejection

All of the pending claims are rejected under section 103, because the claimed subject matter purportedly is obvious over Tucker et al., alone or in combination with Richardson et al. According to the Examiner, since halogen-free olefin polymers that inherently have a thermal deformation at 100 °C of not more than 65% are widely available as taught by Tucker et al. and Richardson et al., the present invention, as defined by the pending claims, would have been obvious to one of ordinary skill in the art. Other claimed properties such as, for example, elongation at break, allegedly are either inherently disclosed in the cited references or would have been obvious therefrom.

The present invention, as defined by the pending claims, relates to a substrate for an adhesive tape, as well as the adhesive tape comprising the aforesaid substrate. The substrate comprises Component A and Component B, in which Component B is a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps and wherein Component B has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, a dynamic storage modulus (E') at 80°C of not less than 40 MPa and less than 180 MPa, and a dynamic storage modulus (E') at 120°C of not less than 12 MPa and less than 70 MPa. The inventive substrate and related adhesive tape comprising Component B do not generate dioxin or toxic gas upon incineration, and have high levels of resistance to thermal deformation and flame resistance, and exhibit a high level of stretchability.

Tucker et al. discloses an electrical tape comprising an adhesive and a halogen-free backing film comprising a resin containing an ethylene-propylene copolymer rubber (EP), ethylene-propylene-diene copolymer rubber (EPDM), ethylene vinyl acetate polymer, and ethylene diamine phosphate. However, Tucker et al. only describes solution or suspension polymerization as methods of preparing EP or EPDM rubber. Therefore, Tucker et al. does not disclose Component B of the substrate of the present invention, as recited in the pending claims. In particular, Tucker et al. does not disclose a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps, let alone a propylene/ethylene copolymer that has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, a dynamic storage modulus (E') at 80°C of not less than 40 MPa and less than 180 MPa, and a dynamic storage modulus (E') at 120°C of not less than 12 MPa and less than 70 MPa. b-p

In the Examples, Tucker et al. discloses a resin component comprising ethylene-vinyl acetate (Elvax 470) (similar to Component A) and ethylene-propylene terpolymer (Epsyn 7506) (similar to Component B). The accompanying Declaration under 37 C.F.R. § 1.132 demonstrates that the dynamic storage modulus of the ethylene-propylene terpolymer (Epsyn 7506) does not satisfy the limitations recited in the pending claims. Moreover, when Epsyn 7506 is used as Component B of the present invention, the thermal deformation of the obtained adhesive tape at 100°C is 100%, which is too high compared to the value of 65% or below that is recited in the pending claims.

Richardson et al. discloses a pressure sensitive adhesive comprising a tape substrate comprising (a) 40-85 wt.% olefin/vinyl or acrylic ester copolymer, (b) 0-20 wt.% low density polyethylene, (c) 20-55 wt.% inorganic filler and/or flame retardant, and (d) a silane coupling agent. Richardson et al. fails to disclose Component B (i.e., a propylene/ethylene copolymer) of the substrate of the present invention, as recited in the pending claims. Indeed, Richardson et al. does not disclose a propylene/ethylene copolymer of any type, let alone a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps in which the copolymer has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, a dynamic storage modulus (E') at 80°C of not less than 40 MPa and less than 180 MPa, and a dynamic storage modulus (E') at 120°C of not less than 12 MPa and less than 70 MPa. w/o 206

Although Kawabata et al. was not applied in combination with Tucker et al. and Richardson et al. in support of the obviousness rejection of claims 1-20, applicants note that Kawabata et al. discloses a flame retardant adhesive tape comprising an adhesive layer formed on a substrate comprising a halogen-free polyolefin resin composition containing *either* a polyolefin resin with a carboxylic group, a carboxylic ester group, or an acid anhydride- w/ 2

containing monomer (similar to Component A of the present invention), an ethylene-propylene copolymer rubber (EP), ethylene-propylene-diene copolymer rubber (EPDM), or a propylene-ethylene copolymer (similar to Component B of the present invention), and an inorganic flame retardant. Even though Kawabata et al. discloses materials similar to Components A and B of the present invention, Kawabata et al. does not teach a composition comprising the specific combination of Components A and B. In addition, Kawabata et al. fails to disclose a propylene/ethylene copolymer prepared by multi-step polymerization with the dynamic storage modulus as recited in the pending claims.

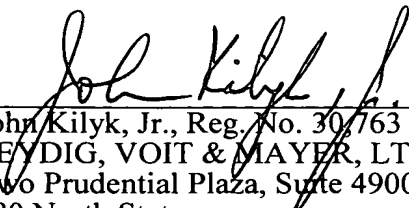
Moreover, nothing in Tucker et al., Richardson et al., or even Kawabata et al. suggests modifying the polymer materials disclosed therein in order to obtain Component B, and then using it in combination with Component A, to form the substrate of the present invention. In addition, none of the cited references recognize that by limiting the dynamic storage modulus of a propylene-ethylene copolymer obtained by multi-step polymerization, an adhesive tape or substrate therefor that does not generate dioxin or toxic gas upon incineration, has high levels of resistance to thermal deformation and flame resistance, and has a high level of stretchability can be prepared.

In view of the foregoing, the present invention, as defined by the pending claims, is not obvious from Tucker et al., Richardson et al., and Kawabata et al., whether considered individually or together. Applicants accordingly request that the obviousness rejection be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



John Kilyk, Jr., Reg. No. 30,763
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

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